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ABSTRACT

Presented is a governance model for in-service science teacher education which was implemented at a four-year college by a committee of classroom teachers, scientists, and county curriculum coordinators. The model accounts for three major dimensions of the curriculum development process: (1) specification of learner objectives, (2) implementation of instructional and learner activities, and (3) formative and summative evaluation. Each dimension of the curriculum development process contained three areas addressed by the governance committee: (1) tasks to be completed by subject matter specialists, (2) tasks to be completed by the governance committee as a whole, and (3) interaction or discussion of policy and curriculum development process. Details are given for the application of the governance model through a National Science Foundation funded institute at Augusta College in Georgia. (Author/CS)

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A GOVERNANCE MODEL

FOR

IN-SERVICE SCIENCE TEACHER EDUCATION

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Paper Presented At

The Regional Convention Of The

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Abstract

A governance model for in-service science teacher education was implemented at a four year college by a committee of classroom teachers, scientists, and county curriculum coordinators. The committee was the governing body of a National Science Foundation* sponsored institute for middle grades teachers who teach one or more classes of science. The model accounts for three major dimensions of the curriculum development process:

1. Specification of learner objectives
2. Implementation of instructional and learner activities
3. Formative and summative evaluation

Each dimension of the curriculum development process contained three areas addressed by the governance committee:

1. Tasks to be completed by subject matter specialists
2. Tasks to be completed by the governance committee as a whole
3. Interaction or discussion of policy and curriculum development process

The governance model incorporates several major dimensions inherent in most approaches to curriculum development and should be easily adapted to areas other than science. The provision for shared control/responsibility among teachers and instructional staff is the model's greatest attribute.

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A GOVERNANCE MODEL

FOR

IN-SERVICE SCIENCE TEACHER EDUCATION

John D. Flowers

In-service education programs for science teachers are implemetned through a variety of workshops, institutes, and visiting scholar lectures or some combination of these means. Most programs are designed undoubtedly to address the dynamic needs of in-service teachers as perceived by teachers themselves, program designers, or teachers and program designers working together. In order to meet a set of science teacher needs one would expect that any plan for developing and implementing a given program would describe the mechanism whereby teachers as well as instructional staff affect the nature of the program. That is, one would expect to find a description of the process whereby classroom teachers and instructional staff influence the selection of instructional objectives and activities that ultimately become the program of study. Since many programs are based on perceived needs of science teachers, one would also expect to find a description of the mechanism whereby on-going program modifications accommodate differences between needs upon which a program is designed and needs ascertained during program implementation. These expectations tend to be most reasonable when in-service science teacher education is viewed from a governance perspective.

Governance--Concession and Compromise

A review of Current Index to Journals in Education (CIJE) from January 1977 to October 1980 lists approximately 132 references to journal articles which address issues and problems related to governance. During the same period of time, Resources In Education (RIE) lists approximately 218 references to position papers, faculty handbooks and other documents pertaining to governance. Two thirds of the references in CIJE and RIE focus on higher education, most frequently including topics such as: power, politics, collective bargaining, teacher education, and faculty policies. The remaining documents are a mix of topics on governance of public education and teaching centers.

The literature on governance from January 1977 to October 1980 reveals a recurring problem involving decisions and compromises on who is to govern and how a given corporate agency, department, etc. is to be governed. For example, the literature on governance of teacher centers is primarily concerned with concessions and compromises evolving out of encounters among boards of education, teacher organizations and teacher education institutions. Descriptions of the function and constituency of governance committees indicate that teachers are demanding and acquiring greater control over their own in-service programs. It appears that the idea of successful governance is dependent upon the number of teachers included in the decision making process and the degree to which teachers influence or control the kinds of in-service programs they are to receive.

Governance--Control and Responsibility

The compromise most often embodied in teacher centers appears

to be related to the concept of shared control/responsibility. Although it is not a new concept, it is timely in view of federal funding of teacher centers during the past five years. In addition to its timeliness, the concept of shared control/responsibility is appealing to project directors and staff development administrators who assume that teachers can exercise judicious control over their in-service training as well as share the responsibility for successful curriculum development and delivery systems.

The spirit of governance may be best labeled as shared control/responsibility, however, the mechanism of governance defies an equally intuitive and all-encompassing label. There is a need for development of governance models that wed the spirit and a set of well defined mechanics of governance. The model presented in this paper is one attempt to attain this elusive unity.

A Governance Model

Relationships among in-service staff tasks, curriculum products/processes, and governance committee tasks are represented in Figure 1. Solid lines indicate flow of action and broken lines indicate formative evaluation.

Developing objectives and activities. Figure 1 indicates that results from a needs assessment are examined by a governance committee. The in-service staff then develops curriculum ends in terms of objectives and activities that are designed to meet the assessed needs. Objectives and activities developed by the staff are then submitted to the governance committee for approval. Committee recommendations for deletion, modification, or addition of objectives and activities are submitted for staff reaction and are then forwarded

to the governance committee. Objectives and activities approved by the governance committee are forwarded to the staff for implementation.

Implementing objectives. Activities developed by the project staff and implemented during the course of instruction are examined by the governance committee. Recommendations are made regarding the appropriateness of the activities. If the activities are considered inappropriate, the staff reconsiders the activities along with any suggestions made by the governance committee. New or modified activities and objectives are then resubmitted to the governance committee for approval.

Evaluating the program. Figure 1 indicates that the nature of summative evaluation is decided upon during the earliest stage of the curriculum development process. All concerned parties are involved with decisions regarding the evaluation process. The mechanism of formative evaluation allows the staff to determine effectiveness of the on-going program. It also helps to identify areas of need which were not identified during the initial needs assessment procedure. Feedback represented by broken lines in Figure 1 indicates the source and direction for formative evaluation. The model requires that any formative evaluation procedure be initiated by the governance committee and results be forwarded to the project staff. The model, thus, provides for formative and summative evaluation with input from both program staff and teachers who will participate in the program.

The Governance Committee

It is useless to talk about governance without an understanding

of the constituency and function of the committee responsible for the successful development and day-by-day activities of an in-service science teacher program. The structure and functions of a governance committee are based on at least three assumptions.

1. The process of curriculum development includes assessment of needs, specification of learner objectives, implementation of instructional and learner activities, and evaluation. Because in-service science programs are envisioned as curriculum development projects, generic components of the curriculum development process should be incorporated into the overall design.

2. The value of learner and subject matter specialist imput into curriculum development is given high priority. The in-service program would be more effective in meeting teachers' needs if there were continuous input from persons who would represent the needs of the teachers as well as the perspective of the staff who would carry out the program.

3. Participant representatives and program staff can cooperatively formulate policies designed to produce and maintain a quality in-service science teacher program of study.

Committee sources. Various sources should be considered for possible inclusion. The prevailing rationale for broad input should result in the selection of persons from at least the following sources:

1. Classroom teachers--In order to assure participant representation, provision should be made to include at least as many participants as there are persons who are responsible for implementing the instructional component of the in-service program. For example, if three college professors will be on the governance committee by virtue of the fact that they will be teaching, then there should be three participants selected or elected to the committee.

2. Subject matter specialists--Persons who serve to carry out the instructional component of the in-service should be included in the governance committee.

3. Curriculum development specialists--The science curriculum specialist from one or more school systems should be invited to serve on the governance committee.

4. Science teacher educator--A science teacher educator from a local college should be invited to serve on the governance committee.

If the in-service program is sponsored by a federally funded teacher center, the majority of persons on the governance committee will be teachers. In any event, there is no reason why there should not be as many participant representatives as there are persons responsible for implementing the instructional component.

Committee functions. The chairperson of the governance committee has the responsibility for calling committee meetings sufficient in number and length to accomplish three general tasks:

1. Develop instructional objectives sufficient for alloted in-service class time and appropriate for the population of teachers to be involved in the program.

2. Utilize participant and staff feedback to modify the number of instructional objectives as well as the rate of implementing objectives and other instructional activities.

3. Develop instruments and procedures for evaluating participants, staff, and effectiveness of the program in meeting its stated objectives.

Members of the governance committee are charged with the responsibility of completing specific tasks regarding development in curriculum ends, implementation of instructional and learner activities, and evaluation. Tasks are clearly delineated to differentiate between staff and committee-as-a-whole responsibilities (See Figures 2-4).

An "interaction" component is also specified for each of three curriculum development processes. The nature of the interaction is such that both staff and participant representatives are compelled to poll their resources to solve problems encountered in the

curriculum development process. For example, the interaction component regarding development of curriculum ends in Figure 2 requires that the collective effort of all committee members be focused on the task of determining the appropriateness of a concept or objective as it relates to middle school science curriculum.

Application of The Governance Model

A needs assessment of teachers in three eastern Georgia counties indicated that teachers perceived themselves as needing additional science knowledge. In order to fill the knowledge gap in three content areas of earth, life, and physical science, an institute at Augusta College was funded by the National Science Foundation. Teachers in grades 4-8 were invited to participate in 3 sets of 7, 4-hour sessions of laboratory and lecture from September 1979 through March 1980. Unlike projects of similar nature and purpose at other four year colleges, the institute for middle grades teachers was designed to function in accordance with the governance model previously outlined. A governance committee was developed according to the model and was authorized to specify learner objectives, make decisions concerning implementation of instructional and learner activities, and develop procedures and instruments for formative and summative evaluation.

A sense of unity and concern for attaining project objectives was enhanced through the governance model. The model was useful in providing direction in carrying out all objectives of the project including curriculum development, implementation and evaluation. Provision for shared control/responsibility among teachers and

instructional staff was the model's greatest asset in directing the in-service program for science teachers in the middle grades.

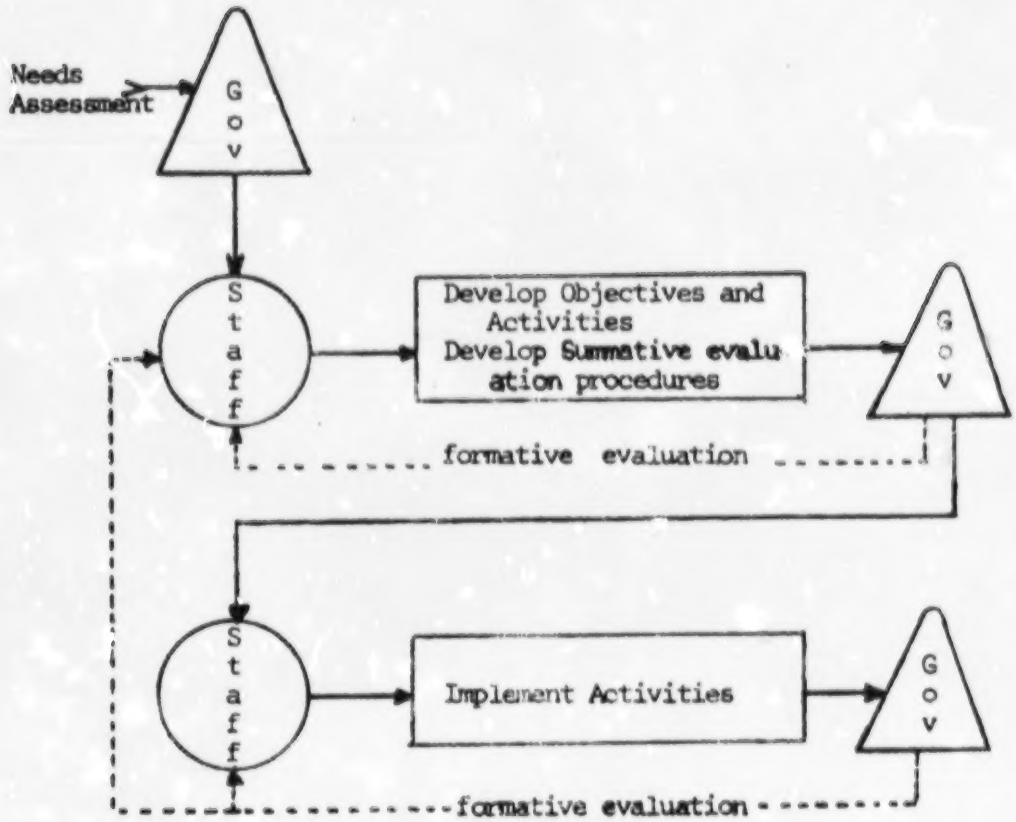

Figure 1

TASK FLOW CHART FOR GOVERNANCE COMMITTEE AND STAFF

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Figure 2

NSF-AYI Curriculum Development:
Tasks and Interaction

Ends: specification of middle grade concepts and objectives

Tasks for Project Staff

1. list all concepts
2. add or delete concepts as approved by Governance Committee
3. write one or more objectives for each concept (objectives will specify exactly what participants will know or be able to do following instruction)
4. delete objectives not approved by Governance Committee

Tasks for Governance Committee

1. approve/reject/modify concept lists for physical, earth, and life sciences
2. approve/reject/modify AYI objectives in content areas
3. add additional concepts
4. add additional objectives

Interaction

The Governance Committee will convene on a regular basis to accomplish curriculum development tasks. Decisions made regarding curriculum development should consider the major criterion of all curriculum tasks (viz., appropriateness of a concept or objective to one or more middle grades).

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Figure 3

NSF-AYI Program Implementation:
Tasks and Interaction

Means and Implementation: activities regarding instruction and participant application-of-knowledge*

Tasks for Project Staff

1. monitor participant application-of-knowledge activities
2. plan lectures, demonstrations, experiments, field trips, and other activities designed to enhance attainment of objectives

Tasks for Governance Committee

1. list activities that demonstrate participant application-of-knowledge
2. specify criteria for evaluating application-of-knowledge activities
3. specify application-of-knowledge deadlines
4. make suggestions for modifying instructional activities

Interaction

During Program Implementation the Project Staff will regularly seek Governance Committee suggestions regarding modification of instructional activities. Procedures for monitoring and implementing application-of-knowledge activities should be specified. The value of any and all Project activities should be regularly examined by the Governance Committee.

*Application-of-Knowledge: two projects developed by participants which demonstrate an on-the-job utilization of knowledge gained in the AYI

Figure 4

NSF-AYI Evaluation:
Tasks and Interaction

Evaluation: formative and summative assessment of Project

Tasks for Project Staff

1. write two multiple choice objective-based items for each objective (knowledge or recall versus higher-than-knowledge)
2. develop a test schedule and grading procedure to be used with each group of participants

Tasks for Governance Committee

1. develop a grading procedure to be used for application-of-knowledge activities
2. make suggestions regarding evaluation of participants, staff, and project objectives

Interaction

Evaluation of the AYI will be in terms of attained objectives. All evaluation preocedures will be shared with participants during their first class meeting. Since a single grade will be awarded, the Governance Committee should resolve the problem of how course-work and application-of-knowledge activities will be reflected in a final grade.

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